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Liquidity Risk Management in EMEs after the Great Recession

: Offshore international debt issue

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Liquidity Risk Management in EMEs after the Great Recession

: Offshore international debt issue

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Abstract

For its global shock channeling problem, a steady increase of offshore international debt after the Great Recession in emerging countries has been noticed. This paper insists that after the crisis, the offshore debt is substituted for onshore debt when emerging countries struggle to finance onshore international bonds. In other words, emerging countries exploit offshore debt to manage the level of international liquidity stable. For instance, when global uncertainty grows, global non-oil commodity price decreases, the domestic government fortifies an inflow of international capital or the domestic financial market is unreliable, the offshore debt replaces the onshore debt.

keywords: Offshore bond, international capital flows, emerging countries, liquidity risk, capital control

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1. Introduction

1) What is the problem of Offshore debt issuance?

After the Great Recession, international debt has been split into two types in emerging countries. Offshore international debt has been extremely increased its issue in emerging countries than before. Before analyzing the phenomenon deeply, let me clarify a definition of the keyword. Offshore international debt is defined as the bond which is issued in a primary market outside the home country, which guarantees the bond, by the Bank in International Settlements (BIS). Offshore bond issuing process demands additional stage, such as a subsidiary in another country to issue international debt in the country's market.

The popular and well-known type of international bond is to issue an international bond directly from their market. Such a bond will be called onshore debt to compare with offshore debt. Conversely, offshore debt is issued indirectly by requiring another process; intra-company capital flows. In other words, offshore debt is the bond that the head office does not issue a bond by themselves but issue by a subsidiary abroad.

Figure 1. The process of offshore debt issuance and onshore debt issuance (Source: BIS)

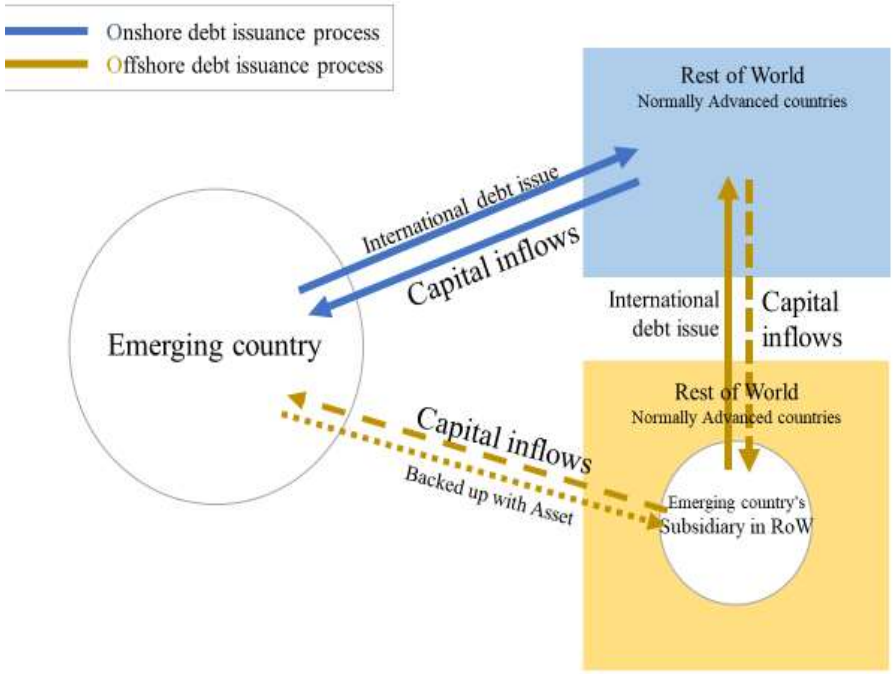
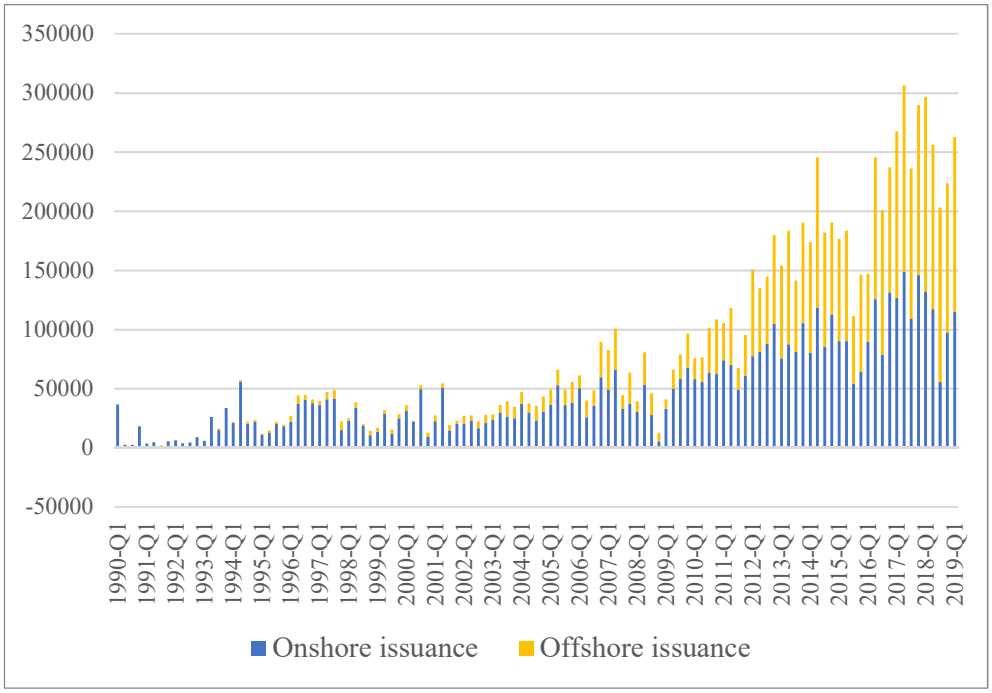


Figure 1 shows two processes, which are issuing offshore international debt and onshore international debt. The blue line indicates the onshore debt issuance process, while the yellow line depicts the entire process of the offshore debt issuance.

Figure 2. International Debt Issuance by EMEs measured by Gross issues

(Source BIS)



Coming back to the phenomenon of the issue, before the Great Recession, offshore debt issuance in emerging countries did not surge apparently. But after the crisis, the opposite situation happened as Chung et al. (2014) and Kim, Shin (2019) paid attention. Figure 2 shows the offshore and onshore international debt issuances which are issued by emerging countries from 1990-Q1 to 2018-Q4. The blue bar indicates onshore debt issuance measured by gross issues, while the yellow bar is offshore debt issuance measured by gross issues. At first, the ratio of the pre-crisis offshore debt was less

than a majority and the amount of it was negligible. However, after the Great Recession, the majority of a proportion of the post-crisis offshore debt shows more than half of international debts and the amount of outstanding of offshore debt increased after the Great Recession.

Economists cautioned such events because of unconscious problems to emerging markets. Chung et al. (2014) alerted that the increasing amount of non-financial corporations' offshore international debt will attack the domestic monetary aggregates and their financial conditions. Specifically, because the offshore debt once more crosses the international financial market indirectly, the domestic market has additional linkage toward global finance. However, governments rarely identify the amount of offshore debt because it only reveals as an intra-company capital, i.e. the government is not able to control the situation of offshore debt. Furthermore, Kim, Shin (2019) conducted panel VAR to verify that the offshore debt in the emerging market became a crucial channel between the global financial market and the domestic market. Even more, when a global crisis occurs, offshore debt has tremendous influence than onshore debt on the domestic market.

2) Research Problem

Even though an increase in offshore debt issuance and their potential risk, there is no paper for discovering the main causes of the increase. For that reason, this paper is to unveil the causes of an increase in offshore debt issuance. The main idea has been brought from Kim, Shin (2019), which suspected the government's capital restraint toward international capital flow. To be specific, emerging countries with strengthened capital control tend to be vulnerable to the offshore debt.

Based on the above finding, I identify the main reason for the offshore debt situation. This paper insists after the Great Recession, offshore international debt seems to reverse its role from the onshore debt, stabilizing the level of international liquidity apart from global and domestic conditions. In other words, the emerging countries desire to exploit the offshore debt issuance to manage the international liquidity risk. Specifically, not only domestic restraint on capital but also other important global and domestic factors seem to affect the movement of offshore debt issuance; global uncertainty, global real non-oil commodity price change, and domestic financial structure.

In the following sections, I will discuss how I selected meaningful variables. Then, I will address how I modified panel regression for finding the main causes, especially using interaction terms. Interaction effects are adjusted to explicate which variables have been changed through the crisis and to overcome empirical obstacles such as limited observations. In the end, I will analyze the meaning of the offshore debt's coefficient as the substitute for the onshore debt, and I will confirm it with the robustness check.

2. Methodology

Factors of international capital flows have been discovered for centuries, while offshore debt did not surge as the main question. To select suspect determinants for offshore debt, I primarily referred to Forbes, Warnock (2012) and Byrne, Fiess (2016). Forbes and Warnock discovered the main factors of extreme events of international capital flows in emerging countries. They found global factors generally engage the dominant role in sudden events of capital

flows. Byrne and Fiess distinguished capital flow from the common global flow and idiosyncratic flow, and they searched for each main reason. For idiosyncratic flow, they pointed out the financial openness, institutional quality, and human capital. Four other references were also considered, and their list is as follows: Contessi et al. (2013), Dell' Erba, Reinhart (2015), Evans, Hnatkovska (2014), Reinhart, Reinhart (2008).

For the first, most references, such as Dell' Erba, Reinhart (2015) and Evans, Hnatkovska (2014), they frequently included global growth, as global real GDP growth. Secondly, global real interest rates and global uncertainty have been included in the global factors. Byrne, Fiess (2016) and Reinhart, Reinhart (2008), who are interested in emerging countries, added global consumer price change. Reinhart and Reinhart highlighted that emerging countries are significantly influenced by commodity price because their economies are contributed by commodity exports toward advanced economies. As this paper are dealing with emerging countries, I accept their view and include it as a ruling variable.

For domestic factors, each economy growth is essential. Some references such as Contessi et al. (2013) did not control international

capital flow by real interest rates, while others did. However, I respected the setting of Byrne, Fiess (2016), which included real interest rates deflated with ex-post consumer price. The additional two domestic components are financial openness[1] and the financial structure, which illustrate characteristics of the financial market. First, financial openness indicates how the country is liberalized against outside capital flows. Second, financial structure means how much financial market is depth, truthful and stable. At least four out of six references included two components, so I finally included those two factors for describing the domestic financial market.

1) Data

The emerging countries was selected by Kim, Shin (2019), but I excluded some countries because of missing data. Selected fifteen emerging countries are as follows: Brazil, Bulgaria, Chile, China, Hong Kong, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Thailand, Ukraine. Data has been collected from 2000-

[1] Capital Control and Financial Openness have been used as opposite measures, i.e. Absolutely controlled capital can be translated into closed financial market.

Q1 to 2016−Q4, but excluded from 2008−Q3 to 2009−Q2 which are the periods of the Great Recession.

The two main dependent variables are constructed by the way in Kim, Shin (2019). The assumption has been presumed as Kim and Shin did, that the international debt issuance by residence represents onshore issuance and the issuance by nationality is the sum of offshore and onshore debt issuance. Therefore, we can approximately reach into offshore and onshore international debts issuance. The two international debt issuances can be collected in Bank in International Settlements (BIS), and following Kim and Shin's approach by dividing with trend GDP.

Independent variables selected by references normally follow their ways. First, real GDP growth for both global and domestic are collected from OECD and IMF IFS. The global real GDP growth has been selected for G7(United States, United Kingdom, France, Germany, Japan, Canada, Italy, and Russia). The global real short interest rates have been built as Byrne, Fiess (2016) did in their paper: 3 Month US Treasury Bill rates deflated ex−post by the annual US Consumer Price inflation. Global uncertainty has been represented by VIX from Chicago Board Options Exchange (CBOE)

as most these do. The global real non-oil commodity price is measured as Reinhart, Reinhart (2009), deflating advanced countries' non-oil commodity price by US wholesale price index.

Domestic real interest rates also followed the method by Byrne, Fiess (2016): nominal lending interest rates deflated by GDP deflator. Domestic capital control has been represented by diverse measures in reference, but I choose Andres Fernandez et al. (2015). However, during a robust check, I tried a more popular measure of financial integration, such as Chinn, Ito (2006). For the last, domestic financial structure has been represented by Debt to GDP (%) from Abbas et al. (2010). As capital control is attempted by much more measure, the financial structure has been rechecked by other measures, either.

2) Regression model

The proposed regression model is as follows:

$$\mathrm{Bond_{i,t}} = \Delta Y_t + r_t^{st} + V_t + \Delta P_t^{com} + \Delta Y_{i,t} + r_{i,t} + CC_{i,t} + FS_{i,t} + \varepsilon_{i,t} \quad (1)$$

, which $\mathrm{Bond_{i,t}}$ is international debt issuance whether offshore or onshore, ΔY_t is global real GDP growth, r_t^{st} is global real short interest rates, V_t is for global uncertainty measure, and ΔP_t^{com} is

global real non−oil commodity price change. Similar to the above definition, $\Delta Y_{i,t}$ is country i' s real GDP growth, $r_{i,t}$ is domestic real interest rates, $CC_{i,t}$ is domestic capital control, and $FS_{i,t}$ represents financial structure for country i. The error term, $\varepsilon_{i,t}$ follows a normal distribution.

Table 1. Regression with each period

	Offshore issuance		Onshore issuance	
	Before the crisis	After the crisis	Before the crisis	After the crisis
global factor				
real GDP growth	-0.001104 (0.589)	-0.001822 (0.692)	0.004818 (0.36)	0.012965 * (0.099)
real short interest rates	0.000119 (0.751)	0.001376 (0.357)	0.000331 (0.731)	0.004243 * (0.096)
uncertainty	-0.000220 ** (0.03)	0.000474 * (0.081)	-0.000301 (0.251)	-0.000904 ** (0.048)
real commodity price change	-0.002108 (0.623)	-0.008532 (0.451)	-0.000923 (0.934)	0.058877 *** (0.002)
domestic factor				
real GDP growth	-0.000527 (0.297)	-0.000118 (0.912)	0.003205 ** (0.015)	0.002182 (0.225)
real interest rates	0.000027 (0.177)	-0.000045 (0.854)	0.000059 (0.285)	0.000204 (0.478)
capital control	-0.00265 (0.381)	0.014006 (0.187)	-0.006262 (0.469)	-0.019839 * (0.056)
financial structure	0.000062 * (0.051)	-0.000227 *** (0.001)	0.000205 ** (0.03)	0.000074 (0.317)
Constant	0.014391 (0.497)	0.044897 (0.408)	0.000639 (0.991)	-0.254299 *** (0.004)
Period terms	34	30	34	30
Number of countries	15		15	

R-squared	0.06517	0.13965	0.04218	0.05319

To compare two international debt issuance regressions in terms of the crisis period, I conduct pre-crisis regressions and post-crisis regressions. Table 1 includes two big sections: offshore and onshore debt issuance as dependent variables, with each before the crisis and after the crisis. Since some coefficients brought opposite signs through two different periods, it is compelling that the offshore debt issuance has been changed its role after the crisis.

First, in the offshore part, global uncertainty has negatively affected the offshore debt before the crisis, while it positively effects after the crisis. In the domestic perspective, regardless of slightly low significance, capital control changes their effects through crisis from negative to positive. Similarly, the financial structure of each country reverses its effect during periods.

On the sides of the onshore debt issuance, only global real non-oil commodity price reverses during the crisis. After the crisis, generally global components earned more significance, and increased

the absolute value of coefficients. This increase could be observed in domestic parts either, except financial structure.

To compare the results by type of issuance in all periods, pre-crisis onshore debt is more vulnerable to factors than pre-crisis offshore debt. Secondly, results tell that offshore and onshore did not show any difference in sign, except for global and domestic real GDP growths and financial structure. On the other hand, after the crisis, offshore and onshore debt issuances are distinguished by a sign. For example, global uncertainty influences two debt issuances oppositely, and domestic capital control and domestic financial structure do, either.

The above results tell that through the crisis, while onshore debt issuance maintains the status, offshore debt issuance changes its role and becomes opposite to onshore debt issuance. Nonetheless, above regressions lack statistical guarantees in irrefutable components such as capital control. To enhance reliability, I come up with detoured regression, using interaction effects.

Specifically, I regress the above model with total period additionally including interaction terms by period-dummy variables,

which indicate 1 in the pre−crisis period. To sum up, the regression has formed with global and domestic components and those interaction terms as follows:

$$\mathrm{Bond_{i,t}} = \Delta Y_t + \Delta Y_t \times D_t + r_t^{st} + r_t^{st} \times D_t + V_t + V_t \times D_t + \Delta P_t^{com} + \Delta P_t^{com} \times D_t + \Delta Y_{i,t} + \Delta Y_{i,t} \times D_t + r_{i,t} + r_{i,t} \times D_t + CC_{i,t} + CC_{i,t} \times D_t + FS_{i,t} + FS_{i,t} \times D_t + \varepsilon_{i,t} \quad (2)$$

, which D_t represents a dummy variable when it is 1 if the period is before the Great Recession.

Table 2. Regression with all interaction terms

	Offshore issuance	Onshore issuance
global factor		
real GDP growth	-0.002655 (0.461)	0.009984 (0.143)
real GDP growth×dummy	0.001898 (0.693)	-0.004256 (0.64)
real short interest rates	0.001245 (0.294)	0.003518 (0.117)
real short interest rates×dummy	-0.000979 (0.463)	-0.002891 (0.252)
uncertainty	0.000544 ** (0.012)	-0.000758 * (0.065)
uncertainty×dummy	-0.000784 *** (0.004)	0.000414 (0.416)
real commodity price change	-0.008684 (0.328)	0.054644 *** (0.001)
real commodity price change×dummy	0.004565 (0.687)	-0.058057 *** (0.007)
domestic factor		
real GDP growth	-0.00051 (0.543)	0.002217 (0.162)
real GDP growth×dummy	-0.000064 (0.953)	0.000219 (0.916)

real interest rates	0.000032 (0.69)	0.000033 (0.831)
real interest rates×dummy	0.000002 (0.984)	0.000031 (0.844)
capital control	0.015733 *** (0.000)	-0.018655 *** (0.000)
capital control×dummy	-0.019763 *** (0.000)	0.012905 * (0.076)
financial structure	-0.000154 *** (0.000)	0.000068 * (0.082)
financial structure×dummy	0.000229 *** (0.000)	0.000064 (0.298)
Constant	0.037403 (0.365)	-0.233976 *** (0.003)
Constant×dummy	-0.014097 (0.793)	0.250736 ** (0.014)
Period terms	64	
Number of countries	15	
R-squared	0.12981	0.05552

If an interaction term is statistically significant, it is interpreted as the dependent variable changes significantly its reaction toward the independent variable during the crisis. So, including all interaction terms, as Table 2, I conclude that only two global components and two domestic components have significant interaction effects for two international debt issuances. Those components are as follows: global uncertainty, global real commodity price change, domestic capital control, and domestic financial structure.

Finally, I reach to final regression equation as follows:

$$\text{Bond}_{i,t} = \Delta Y_t + r_t^{st} + V_t + V_t \times D_t + \Delta P_t^{com} + \Delta P_t^{com} \times D_t + \Delta Y_{i,t} + r_{i,t} +$$

$$CC_{i,t} + CC_{i,t} \times D_t + FS_{i,t} + FS_{i,t} \times D_t + \varepsilon_{i,t} \qquad (3)$$

Other variables did not change from equation (1) and equation (2).

3. Regression result

Table 3. Regression with selected interaction terms

	Offshore issuance		Onshore issuance	
	Before the crisis	After the crisis	Before the crisis	After the crisis
global factor				
real GDP growth	-0.001563 (0.504)		0.007084 (0.11)	
real short interest rates	0.000561 (0.29)		0.00106 (0.291)	
uncertainty	-0.000234 ** (0.028)	0.000471 ** (0.025)	-0.000329 * (0.078)	-0.00074 * (0.062)
real commodity price change	-0.004886 (0.125)	-0.013373 * (0.057)	-0.001854 *** (0.006)	0.042818 *** (0.001)
domestic factor				
real GDP growth	-0.00074 (0.198)		0.002973 *** (0.006)	
real interest rates	0.000013 (0.667)		0.000108 ** (0.046)	
capital control	-0.009588 *** (0.000)	0.009883 * (0.08)	-0.003914 * (0.075)	-0.018145 * (0.065)
financial structure	-0.00005 *** (0.000)	-0.000252 *** (0.000)	0.000219 * (0.077)	0.000149 * (0.057)
Constant	0.037896 * (0.062)	0.071161 ** (0.035)	0.000309 ** (0.012)	-0.188078 *** (0.003)
Period terms	64			
Number of countries	15			

R-squared	0.09752	0.04956

1) Before the Great Recession

At the side of offshore debt issuance, both global and domestic real GDP growths and real interest rates did not show any significance. So, I mainly concentrated on four main independent components: global uncertainty, global real non-oil commodity price change, domestic capital control, and domestic financial structure. These coefficients between the offshore debt and the onshore debt issuances are showing noticeable outcomes; they possess negative signs, except for domestic financial structure.

For instance, the coefficients of global uncertainty in offshore and onshore are -0.000234(0.028) and -0.000329(0.078). Both coefficients have negative but significant correlations with two international debts issuance, which mean that two international debt issuances react to global uncertainty in the same way. In other words, if the global economy became unstable and unpredictable, in the emerging market, both offshore and onshore international debts decrease their issue. In the same knowledge, when real non-oil commodity price change increases, both international debt issuances

decrease. This is because advanced countries are responsible for the majority of investment in the emerging market. So, when commodity price inflates, to smooth lifetime consumption, advanced countries decrease their investment, especially toward the emerging market. Domestic components can be interpreted similarly. If the government of emerging countries restricts international capital, it is obvious to predict that international debts issuance will decrease. At that point, coefficients of both international debt issuances in capital control are negative in pre-crisis.

However, the domestic financial structure shows an opposite signal between two international debt issuances. The coefficient of offshore debt issuance is −0.00005(0.000), while the coefficient of onshore debt issuance is 0.000219(0.077). When the emerging country has a stable and concrete financial system, such as reliable law and uncorrupt government, a bond is typically issued by an onshore method, not by an offshore method. That is a much more unstable financial system brings, more offshore debt is issued. So, it could be said that according to the level of financial structure, offshore debt will be exploited as a substitute for onshore debt. However, the

majority of factors did not attract borrowers to issue offshore debt, i.e. offshore debt was identical with onshore debt.

2) After the Great Recession

The most interesting finding is that after the crisis, the offshore debt issuance specialized their role itself as moving oppositely compared with onshore issuance toward global and domestic circumstances. Two international debts of once similar role diversify their usage, therefore, their coefficient' s signs become opposite in post-crisis. In the offshore debt side, the first column of Table 3, I can find that the coefficients of global uncertainty and domestic capital control changed their sign from negative correlation −0.000234(0.028) and −0.009588(0.000) to positive correlation 0.000471(0.025) and 0.009883(0.08).

In the onshore sides, the last two columns of Table 3, the coefficients of real non-oil commodity price change reverse from negative correlation −0.001874(0.006) to positive correlation 0.042818(0.001) during the Great Recession. Including the financial

system, such changes lead to four opposite reactions toward two international debt issuances.

For example, when global uncertainty increases or advanced countries hesitate to invest emerging countries, emerging countries react to issue bonds by offshore debt rather than onshore ones. A similar situation happens to the other three components: global real non-oil commodity price change, domestic capital control, and domestic financial structure. Therefore, after the Great Recession, investors and borrowers in the emerging markets changed their strategy, i.e. substituting two international debt issuances. By doing so, an individual emerging country can pursue stable states in international capital flows, independent of global and domestic circumstances.

Offshore debt issuance is specialized in undesirable circumstances for investment. When the global financial condition is not welcoming emerging countries, such as a higher global uncertainty or an increase in a real non-oil commodity price change, offshore debt shows much more issuance. Their correlations are each 0.000471(0.025) and -0.013373(0.057). In other words, as the global economy seems to be hard to finance, emerging countries

issue bonds by offshore debt issuance. The most logical narration for such a situation is that a subsidiary which directly issues the international bond for home country is normally in other advanced countries, which pretends to be an advanced countries' company. Even if the subsidiary is well-known as an emerging countries' company, because the subsidiary is partially under the advanced countries' control, much more reliability occurs than the home company in emerging countries. In other words, investor prefers to invest in the subsidiary in advanced countries rather than the head office in emerging countries. The same explanation can be adjusted into domestic components.

Offshore debt issuance has a positive correlation 0.009883(0.08) with domestic capital control and negative correlation -0.000252(0.000) with domestic financial structure. If home emerging country is having a strict policy toward international capital, so that hard to finance from outsides, the company gathers money by issuing offshore debt from a subsidiary's country. If the home countries' financial system is weak, the same thing will happen.

Therefore, much more hardship happens to finance in emerging countries, much more offshore debt will be issued.

Opposite situation emerges in onshore debt issuance. Onshore debt issuance has a negative correlation −0.00074(0.062) with global uncertainty and positive correlation 0.042818(0.001) with a real non−oil commodity price change. The reaction toward global uncertainty is the right opposite of offshore debt issuance. However, real non−oil commodity price change demands an additional explanation. Reinhart, Reinhart (2010) explained this positive relationship between international debt in emerging countries and real commodity price change by exports. Since the main producers of a commodity are emerging countries in these decades, when commodity price increases, investors love to invest in emerging countries rather than advanced countries.

As the global factors did, the onshore debt issuance has an opposite sign in two important domestic components, capital control, and financial structure. Each coefficient is −0.018145(0.065) and 0.000149(0.057). This illustrates that when domestic financial flexibility improves, emerging countries are eager to issue onshore debts rather than onshore debts.

While offshore debt did not show statistically significant with domestic real GDP growth and domestic real interest rates, onshore debt did show both positive correlation, 0.002973(0.006) and 0.000108(0.046). Because offshore subsidiary is not directly connected with home countries, it is natural that there will be no correlation between domestic growth and domestic real interest rates. However, onshore debt is somewhat different. Since the bond depends a lot on their own countries, if the domestic growth grows or real interest rates increase, the country became attractive to invest. Finally, as the country grows its economy and productivity, the onshore bond increases its issue.

4. Robustness check

1) Global components robust check

To confirm the assertion, I conduct several robust checks. First, I attempt to clarify the influence of global uncertainty and real non-oil commodity price change on offshore debt issuance and

onshore debt issuance. The main problem of global factors' narration is that significant global components were not generally used in classical economic models. To assure the irreplaceable characteristics of two unfamiliar global factors, the robust model suggests replacing variables that might be omitted variable.

Table 4 in the Appendix

First, real short interest rates are replaced by real long interest rates. The robust results can be found in the first column of each debt issuance in Table 4. Byrne, Fiess (2016) mentioned that real short interest rates explain much more bond flows better than real long interest rates, but to express the importance of real interest as extended definition, I substitute the short rates to long rates and come up with similar results with both original results of two international debt issuances.

Secondly, it is valuable to call in a question that real non-oil commodity price change should be included and dealt as an essential factor, because it was only explicated as an emerging countries'

factor by Reinhart, Reinhart (2008). In the long term, commodity price will affect indirectly two international debt issuances by real long interest rates, or in a large economy, it can directly affect international debt issuance by global liquidity. So, it is necessary to check whether regression replaced by global real long interest rates or global liquidity keeps their analysis. The second and third columns in Table 4 have introduced those regressions. Long story short, the global liquidity did not show the influence on two international debts and even did not replace the real non-oil commodity price. The third column shows the real long interest rates substituting real non-oil commodity price change. The result illustrates that only with the real long interest rates, the regressions cannot control the variables better than the real non-oil commodity price change. While current economic models lack sophisticated analysis for global inflation to emerging countries, it seems to be true that the real non-oil commodity price has its unique role in emerging countries.

2) Domestic components robust check

Domestic components have been checked for their robustness by using other measures for each variable.

Table 5 & Table 6 in the Appendix

Firstly, domestic real interest rates have been replaced by real interest rates measured by the World Bank year by year. The results can be found in the first column of Table 5 and Table 6. Secondly, domestic capital control has been attempted for specific measures, bond control in Andres Fernandez et al. (2015) and another well-known financial openness measure Chinn, Ito (2008)' s measure. Two capital restraint' s substitutes are indicated in the second and third columns of each international debt issuance. Lastly, the financial structure has been represented by diverse measures in Table 5 and Table 6, so I additionally checked with stock market capitalization to GDP (%) in Beck et al. (2009) and Private credit to GDP (%) in Abbas et al. (2010). The results are in the fourth and fifth columns of Table 5 and Table 6. All robust checks for domestic components tell that there is seldom error in analysis.

5. Conclusion

Before the Great Recession, the offshore debt and onshore debt did not distinguish themselves, so offshore debt was not exploited a lot. The only little amount of offshore debt has been used for the countries which have low qualified financial structure.

However, after the Great Recession, in emerging countries, offshore debt evolved to execute another role, as a substitute for onshore debt. For such purpose, regardless of an additional hassle stage of offshore debt issuance, offshore debt has been increased its amounts and issuance. If global economic conditions get severe to finance, such as an increased uncertainty or low profit from exports, investors in advanced countries hesitate to provide money to emerging countries. To trade off the loss of international bonds, emerging countries borrow from offshore debt, which does not directly connect to emerging economies. On the side of emerging countries, they prefer to issue offshore debt, when their domestic conditions are going worse to finance, such as unwelcomed policy on the international bond issue and flimsy financial market systems.

Therefore, offshore debt is the method for emerging countries to manage international liquidity risk, by reacting oppositely to onshore debt especially on global uncertainty, global real non-oil commodity price change, domestic capital control, and domestic financial structure.

To overcome the problem of less observation, this paper has used the interaction effects. Furthermore, by doing so, it proved offshore debt issuance' s responses toward some variables have been changed through the Great Recession. However, because the methodology is not dealing with the main question directly, that what made the offshore debt increased through the crisis more attempts should be tried, such as regressing with each pre-crisis and post-crisis. Not only the empirical approach but also modeling should be done because most of the significant factors are disconnected with the classical model.

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Appendix

Table 4. The Robustness check for global components

	Offshore issuance			Onshore issuance		
	(1)	(2)	(3)	(4)	(5)	(6)
global factor						
real GDP growth	-0.001497	-0.001087	-0.000991	0.00688	0.005883	0.00667
	(0.527)	(0.642)	(0.674)	(0.125)	(0.186)	(0.136)
real short interest rates		0.000866 *	0.000853		-0.000245	0.000228
		(0.091)	(0.188)		(0.801)	(0.853)
real long interest rates	0.000171		0.000396 *	0.000868		-0.000968
	(0.794)		(0.077)	(0.486)		(0.280)
uncertainty before crisis	-0.000242 **	-0.000209	-0.000174 *	-0.000355 *	-0.000391	-0.000306
	(0.029)	(0.138)	(0.077)	(0.061)	(0.230)	(0.280)
uncertainty after crisis	0.000459 **	0.000373	0.000378 *	-0.00077 *	-0.000566	-0.000394
	(0.028)	(0.131)	(0.06)	(0.052)	(0.227)	(0.302)
real commodity price change before crisis	-0.003991 *			0.000921 ***		
	(0.081)			(0.008)		
real commodity price change after crisis	-0.01542 **			0.040913 ***		
	(0.027)			(0.002)		
liquidity change before crisis		-0.002655			-0.002189	
		(0.912)			(0.797)	
liquidity change after crisis		0.002795			-0.027827	
		(0.9)			(0.511)	
domestic factor						
real GDP growth	-0.000752	-0.000756	-0.000719	0.002904 ***	0.002928 ***	0.002939 ***
	(0.194)	(0.191)	(0.207)	(0.008)	(0.007)	(0.006)
real interest rates	0.000016	0.000012	0.000021	0.000114 **	0.000114 **	0.000104 **
	(0.582)	(0.682)	(0.455)	(0.034)	(0.036)	(0.04)
capital control before crisis	-0.009135 ***	-0.009551 ***	-0.007692 ***	-0.003226 *	-0.003444 *	-0.004274 **
	(0.000)	(0.000)	(0.000)	(0.081)	(0.072)	(0.037)
capital control after crisis	0.010327 *	0.010077 *	0.012336 **	-0.017477 *	-0.01807 *	-0.01924 **
	(0.067)	(0.076)	(0.012)	(0.075)	(0.068)	(0.021)
financial structure before crisis	-0.000048 ***	-0.000043 ***	-0.000002 ***	0.000223 *	0.000206	0.00017
	(0.000)	(0.000)	(0.000)	(0.070)	(0.109)	(0.102)
financial structure after crisis	-0.000251 ***	-0.000244 ***	-0.000211 ***	0.000151 *	0.000132 *	0.000101
	(0.000)	(0.000)	(0.000)	(0.054)	(0.095)	(0.114)
Constant before crisis	0.033457 **	0.059354	0.010194	-0.013332 **	0.031659	-0.003721
	(0.050)	(0.865)	(0.144)	(0.018)	(0.792)	(0.201)
Constant after crisis	0.079901 **	-0.040339	0.003961	-0.181069 ***	0.497104	0.015663
	(0.019)	(0.917)	(0.54)	(0.005)	(0.501)	(0.162)
Period terms (T)		64			64	
Number of countries (n)		15			15	
R-squared	0.09798	0.09672	0.11116	0.04841	0.04119	0.04265

Table 5. The Robustness check for domestic factor (Offshore debt issuance)

	Offshore issuance					
	(1)	(2)	(3)	(4)	(5)	(6)
global factor						
real GDP growth	-0.001427	-0.001565	-0.001658	-0.001655	-0.000021	-0.001563
	(0.517)	(0.5)	(0.478)	(0.477)	(0.982)	(0.504)
real short interest rates	0.000549	0.000594	0.000481	0.000487	-0.00019	0.000561
	(0.268)	(0.256)	(0.363)	(0.356)	(0.353)	(0.29)
uncertainty before crisis	-0.000232 **	-0.000246 **	-0.000249 **	-0.000238 **	-0.000103 *	-0.000234 **
	(0.021)	(0.016)	(0.028)	(0.023)	(0.091)	(0.028)
uncertainty after crisis	0.000458 **	0.00051 **	0.000455 **	0.000482 **	-0.000094	0.000471 **
	(0.02)	(0.014)	(0.03)	(0.021)	(0.245)	(0.025)
real commodity price change before crisis	-0.002682	-0.002553	-0.002921	-0.005025 *	0.002508	-0.004886
	(0.249)	(0.139)	(0.113)	(0.065)	(0.119)	(0.125)
real commodity price change after crisis	-0.010654	-0.013585 *	-0.014318 **	-0.015455 **	0.004991 *	-0.013373 *
	(0.107)	(0.051)	(0.042)	(0.027)	(0.068)	(0.057)
domestic factor						
real GDP growth	-0.000556	-0.000897	-0.00073	-0.000441	0.000016	-0.00074
	(0.293)	(0.128)	(0.205)	(0.439)	(0.948)	(0.198)
real interest rates	0.000254 **	0.000255 *	0.000017	0.000033	0.000055 ***	0.000013
	(0.041)	(0.062)	(0.564)	(0.253)	(0.000)	(0.667)
capital control before crisis	-0.006501 ***	-0.007548 ***	-0.002651 ***	0.009456 ***	0.000644 ***	-0.009588 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(1.000)	(0.000)
capital control after crisis	0.012472 ***	0.008355	0.013865 ***	-0.015663 ***	0.00417 ***	0.009883 *
	(0.01)	(0.137)	(0.001)	(0.000)	(0.000)	(0.08)
financial structure before crisis	-0.000004 ***	-0.000052 ***	-0.000071 ***	-0.000032 ***	0.000026 ***	-0.00005 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
financial structure after crisis	-0.000206 ***	-0.000276 ***	-0.000274 ***	-0.00025 ***	0.000032 ***	-0.000252 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Constant before crisis	0.021736	0.025006 *	0.026756 *	0.026374 **	-0.011371 *	0.037896 *
	(0.217)	(0.084)	(0.062)	(0.014)	(0.086)	(0.062)
Constant after crisis	0.051301	0.071243 **	0.075321 **	0.093721 ***	-0.026057 **	0.071161 **
	(0.104)	(0.034)	(0.026)	(0.005)	(0.042)	(0.035)
Period terms	64	64	64	64	64	64
Number of countries	15	15	15	15	12	15
R-squared	0.11099	0.1059	0.09968	0.11492	0.08905	0.09752

Table 6. The Robustness check for domestic factor (Onshore debt issuance)

	Onshore issuance					
	(1)	(2)	(3)	(4)	(5)	(6)
global factor						
real GDP growth	0.007076 * (0.09)	0.007202 (0.104)	0.007046 (0.112)	0.007419 * (0.093)	-0.000232 (0.935)	0.007084 (0.11)
real short interest rates	0.00131 (0.163)	0.001479 (0.138)	0.001017 (0.31)	0.001185 (0.236)	0.000203 (0.751)	0.00106 (0.291)
uncertainty before crisis	-0.000293 (0.112)	-0.000317 (0.126)	-0.000342 * (0.083)	-0.000287 * (0.075)	-0.000528 *** (0.003)	-0.000329 * (0.078)
uncertainty after crisis	-0.000638 * (0.087)	-0.000643 (0.104)	-0.000714 * (0.072)	-0.000781 ** (0.048)	-0.00039 (0.124)	-0.00074 * (0.062)
real commodity price change before crisis	0.000087 *** (0.003)	-0.001671 *** (0.005)	-0.001364 *** (0.005)	-0.005791 *** (0.002)	-0.007471 * (0.059)	-0.001854 *** (0.006)
real commodity price change after crisis	0.042316 *** (0.001)	0.043169 *** (0.001)	0.043725 *** (0.001)	0.04626 *** (0.001)	0.01878 ** (0.028)	0.042818 *** (0.001)
domestic factor						
real GDP growth	0.00306 *** (0.002)	0.003467 *** (0.002)	0.002955 *** (0.007)	0.002931 *** (0.007)	0.000124 (0.872)	0.002973 *** (0.006)
real interest rates	0.000799 *** (0.000)	0.000842 *** (0.001)	0.000119 ** (0.035)	0.000092 * (0.094)	0.000002 (0.959)	0.000108 ** (0.046)
capital control before crisis	0.000447 ** (0.023)	0.001182 ** (0.030)	0.000171 (0.277)	0.018114 *** (0.004)	-0.005404 * (0.054)	-0.003914 * (0.075)
capital control after crisis	-0.017171 ** (0.047)	-0.017045 * (0.078)	-0.009281 (0.249)	0.026479 *** (0.001)	-0.006596 * (0.062)	-0.018145 * (0.065)
financial structure before crisis	0.000173 * (0.067)	0.000209 * (0.059)	0.000272 ** (0.047)	0.000187 (0.130)	0.000034 (0.550)	0.000219 * (0.077)
financial structure after crisis	0.000135 ** (0.041)	0.000157 ** (0.043)	0.000197 ** (0.027)	0.000145 * (0.06)	-0.000014 (0.615)	0.000149 * (0.057)
Constant before crisis	-0.011008 *** (0.006)	-0.005152 *** (0.009)	-0.007022 *** (0.007)	0.007571 *** (0.002)	0.052976 (0.101)	0.000309 ** (0.012)
Constant after crisis	-0.189517 *** (0.001)	-0.195252 *** (0.002)	-0.20131 *** (0.002)	-0.226971 *** (0.000)	-0.066436 * (0.097)	-0.188078 *** (0.003)
Period terms	64	64	64	64	64	64
Number of countries	15	15	15	15	12	15
R-squared	0.04742	0.04736	0.04216	0.06904	0.0422	0.04956

Data

Dependent variables

Onshore and Offshore international debts issuance divided by trend GDP: BIS

Independent variables

Global factors

Real GDP growth: G7 real GDP growth in OECD

Real short interest rates: 3 Month US Treasury Bill rate and 10 years US government bond yield deflated ex-post by the annual US Consumer Price inflation from IMF following Byrne, Fiess (2015)

Uncertainty: VIX from CBOE

ADV real non-oil commodity price: IMF based upon Non-oil commodity prices deflated by US wholesale price index following Reinhart and Reinhart (2009)

Domestic factors

Real GDP growth: OECD, IMF IFS and Chang et al. (2016)

Real interest rates: nominal lending interest rates deflated by GDP deflator from IMF IFS following by Byrne, Fiess (2015)

Capital Control: Andres Fernandez et al. (2015), Chinn, Ito (2006)

Financial Structure: Debt to GDP (%) from Abbas et al. (2010), Private credit by deposit money banks to GDP and Stock market capitalization to GDP (%) from Beck et al. (2009)

요약(국문 초록)

국제적 충격을 국내로 전달하는 문제를 지닌, 국외 채권은 2008년 금융위기 이래로 개발도상국을 중심으로 꾸준히 증가하고 있다. 위 논문은 이러한 변화가 금융위기 이후 국외 채권이 기존의 국제 채권이 발행되기 어려워 그 대체재로서 존재하기 때문이라고 주장한다. 즉, 개발도상국 내에서 국제 유동성의 수준을 외·내부 환경과 독립하여 일정 수준으로 유지하기 위해 국외 채권을 활용하는 것으로 보인다. 가령, 국제적 불확실성이 높아지거나, 국제 비유류 상품 가격이 감소하거나, 개발도상국의 외국 자본에 대한 규제가 강화되고 그 자본 시장 구조가 취약해지는 경우들이다. 금융위기를 기점으로 국외 채권의 활용 방도가 달라짐을 보이기 위해, 상호작용 효과를 활용하여 국외채권이 위의 반응들에 어떤 식으로 변화하였는지를 보인다.

주요어 : 국외 채권, 국제 자본 흐름, 개발도상국, 유동성 관리, 자본 규제

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